



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2015-3324; Notice No. 25-16-04-SC]

Special Conditions: L-3 Communications Integrated Systems; Boeing Model 747-8 Series Airplanes, Large Non-Structural Glass in the Passenger Compartment

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed special conditions.

SUMMARY: This action proposes special conditions for the Boeing Model 747-8 airplane. This airplane, as modified by L-3 Communications Integrated Systems, will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport-category airplanes. This design feature is large, non-structural glass panels in the passenger compartment. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These proposed special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: Send your comments on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: Send comments identified by docket number FAA-2015-3324 using any of the following methods:

- *Federal eRegulations Portal:* Go to <http://www.regulations.gov/> and follow the online instructions for sending your comments electronically.
- *Mail:* Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE., Room W12-140, West Building Ground Floor, Washington, DC, 20590-0001.
- *Hand Delivery or Courier:* Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.
- *Fax:* Fax comments to Docket Operations at 202-493-2251.

Privacy: The FAA will post all comments it receives, without change, to <http://www.regulations.gov/>, including any personal information the commenter provides. Using the search function of the docket Web site, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the **Federal Register** published on April 11, 2000 (65 FR 19477-19478), as well as at <http://DocketsInfo.dot.gov/>.

Docket: Background documents or comments received may be read at <http://www.regulations.gov/> at any time. Follow the online instructions for accessing the docket or go to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Jayson Claar, FAA, Airframe and Cabin Safety, ANM-115, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington, 98057-3356; telephone 425-227-2194; facsimile 425-227-1320.

SUPPLEMENTARY INFORMATION:

Comments Invited

We invite interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data.

We will consider all comments we receive by the closing date for comments. We may change these special conditions based on the comments we receive.

Background

On May 10, 2011, L-3 Communications Integrated Systems applied for a supplemental type certificate for large, non-structural glass panels in the passenger compartment in Boeing Model 747-8 airplanes. The Model 747-8 airplane is a derivative of the Boeing Model 747-400 airplane currently approved under type certificate no. A20WE. The airplane, as modified by L-3 Communications Integrated Systems, is a four-engine, jet-transport airplane that will have a maximum takeoff weight of 970,000 lbs, capacity for 24 crewmembers, and taxi, takeoff, and landing seating for 143 passengers.

Type Certification Basis

The certification basis for the Boeing Model 747-8 airplane, as defined in type certificate no. A20WE, is title 14, Code of Federal Regulations (14 CFR) part 25 as amended by

amendments 25-1 through 25-120, with exceptions for structures and systems that were unchanged from the 747-400 design.

Under the provisions of § 21.101, L-3 Communications Integrated Systems must show that the Model 747-8 airplane, as changed, continues to meet the applicable provisions of the regulations listed in type certificate no. A20WE, or the applicable regulations in effect on the date of application for the change, except for earlier amendments as agreed upon by the FAA.

The regulations listed in the type certificate are commonly referred to as the “original type certification basis.”

In addition, the certification basis includes certain special conditions, exemptions, or later amended sections of the applicable part that are not relevant to these special conditions.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Boeing Model 747-8 airplane because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the applicant apply for a supplemental type certificate to modify any other model included on the same type certificate to incorporate the same novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Model 747-8 airplane must comply with the fuel-vent and exhaust-emission requirements of 14 CFR part 34 and the noise-certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type certification basis under § 21.101.

Novel or Unusual Design Features

L-3 Communications Integrated Systems is modifying a Boeing Model 747-8 airplane to install a head-of-state interior arrangement. This airplane, as modified, will have a novel or unusual design feature associated with the installation of large, non-structural glass panels in the cabin area of an executive interior occupied by passengers and crew. The installation of these glass items in the passenger compartment, which can be occupied during taxi, takeoff, and landing, is a novel or unusual design feature with respect to the material being installed. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature.

The use of glass has resulted in trade-offs between the one unique characteristic of glass—its capability for undistorted or controlled light transmittance, or transparency—and the negative aspects of the material, such as extreme notch-sensitivity, low fracture resistance, low modulus of elasticity, and highly variable properties. While reasonably strong, glass is nonetheless not a desirable material for traditional airplane applications because it is heavy (about the same density as aluminum), and when it fails, it breaks into extremely sharp fragments that have the potential for injury and have been known to be lethal. Thus the use of glass traditionally has been limited to windshields, and instrument or display transparencies. The regulations only address, and thus only recognize, the use of glass in windshield or window applications. These regulations do address the adverse properties of glass, but even so, pilots are occasionally injured from shattered glass windshields. FAA policy allows glass on instruments and display transparencies.

Other installations of large, non-structural glass items have included the following:

- Glass panels integrated onto a stairway handrail closeout.

- Glass panels mounted in doors to allow visibility through the door when desired.
- Glass doors on some galley compartments containing small amounts of service items.

Discussion

No specific regulations address the design and installation of large glass components in airplane passenger cabins. Existing requirements, such as §§ 25.561, 25.562, 25.601, 25.603, 25.613, 25.775, and 25.789, in the Boeing Model 747-8 airplane certification basis applicable to this supplemental type certificate project, provide some design standards appropriate for large glass component installations. However, additional design standards for non-structural glass augmenting the existing design are needed to complement the existing requirements. The addition of glass involved in this installation, and the potentially unsafe conditions caused by damage to such components from external sources, necessitate assuring that adequate safety standards are applied to the design and installation of the feature in Boeing Model 747-8 airplanes.

For purposes of these special conditions, a large glass component is defined as a glass component weighing 4 kg (9 lbs) or more. Groupings of glass items that individually weigh less than 4 kg, but collectively weigh 4 kg or more, also would need to be included. The proposed special conditions also apply when showing compliance with the applicable performance standards in the regulations for the installation of these components. For example, heat-release and smoke-density testing must not result in fragmentation of the component.

These proposed special conditions will reduce the hazards from breakage, or from these panels' potential separation from the cabin interior. These proposed special conditions contain

the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

Applicability

As discussed above, these special conditions are applicable to Boeing Model 747-8 series airplanes. Should L-3 Communications Integrated Systems apply at a later date for a supplemental type certificate to modify any other model included on type certificate no. A20WE to incorporate the same novel or unusual design feature, these special conditions would apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features on one model series of airplane. It is not a rule of general applicability and affects only the applicant who applied to the FAA for approval of these features on the airplane.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

The Proposed Special Conditions

For large glass components installed in a cabin occupied by passengers or crew who are not otherwise protected from the injurious effects of failure of the glass installations, the L-3 Communications Integrated Systems glass installations on this Boeing 747-8 airplane must meet the following conditions:

1. **Material:** The glass used must be tempered or otherwise treated to ensure that when fractured, it breaks into small pieces with relatively dull edges. This must be demonstrated by testing to failure.
2. **Fragmentation:** The glass-component installation must control the fragmentation of the glass to minimize the danger from flying glass shards or pieces. This must be demonstrated by impact and puncture testing to failure.
3. **Component Strength:** The glass component must be strong enough to meet the load requirements for all flight and landing loads, including any of the applicable emergency-landing conditions in subparts C & D of 14 CFR part 25. In addition, glass components that are located such that they are not protected from contact with cabin occupants must not fail due to abusive loading, such as impact from occupants stumbling into, leaning against, sitting on, or performing other intentional or unintentional forceful contact with the glass component. The effect of design details such as geometric discontinuities or surface finish, e.g., embossing, etching, etc., must be assessed.
4. **Component Retention:** The glass component, as installed in the airplane, must not come free of its restraint or mounting system in the event of an emergency landing. Both the directional loading and rebound conditions must be assessed. The effect of design details such as geometric discontinuities or surface finish, e.g., embossing, etching, etc., must be assessed.
5. **Instructions for Continued Airworthiness:** The instructions for continued airworthiness must reflect the method used to fasten the panel to the cabin interior and must ensure the reliability of the methods used, e.g., life limit of adhesives, or clamp connection. The

applicant must define any inspection methods and intervals based upon adhesion data from the manufacturer of the adhesive, or upon actual adhesion-test data, if necessary.

Issued in Renton, Washington, on February 16, 2016.

Dionne Palermo,
Acting Manager, Transport Airplane Directorate,
Aircraft Certification Service.

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